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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,675	07/29/2003	Richard M. H. New	HSJ920030169US1	6409

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EXAMINER
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GENTRY, DAVID G

ART UNIT	PAPER NUMBER
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2114

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/629,675

Applicant(s)

NEW ET AL.

Examiner

David G. Gentry

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 21 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 5-19 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-19 and 25-27 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5-8, 21-23 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**Final Rejection**

***Summary of Claims***

Claims 1, 2, 5-19, and 21-27 are pending.

Claims 9-19 and 25-27 are allowed.

Claim 24 is objected to as being dependent on a rejected claim, but would be allowable if put in independent form.

Claims 1 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Pfeffer et al. (U.S. Patent No. 5,210,860).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Pfeffer in further view of Lester et al. (U.S. Patent No. 6,715,116).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Coulson (U.S. Patent No. 6,345,349).

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan and Coulson in further view of Pfeffer.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan, Coulson, and Pfeffer in further view of Lester et al. (U.S. Patent No. 6,715,116).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Pfeffer et al. (U.S. Patent No. 5,210,860).

As per claim 1, Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk

(column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller),

the drive controller executing logic comprising:

executing a scrub cycle including: reading at least one data unit (column 12, line 65- column 13, line 6);

determining whether an error exists in the data unit (column 12, line 65- column 13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62);

executing the reading and determining logic for subsequent data units (column 13, lines 45-63; Note: the periodic scrubbing procedure shows that the scrubbing operation is continuing throughout the entire sector).

Belsan fails to disclose a disk drive where the scrub cycle is interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35) comprising:

if a user request for at least one of: a data read, and a data write, is received, interrupting the scrub cycle to fulfill the request, and then waiting a delay period after fulfilling all user requests in a user request queue prior to resuming the scrub cycle (column 6, lines 51-54), wherein the delay period is an adaptive delay period that depends on a number of user requests received from the RAID controller (column 11, lines 57-62; Note: the delay period depends on the user request to change the TIMER period).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the interrupt method as described by Pfeffer in the hard disk drive described by Belsan. It would have been obvious because Pfeffer allows the scrubbing technique to continue without affecting normal disk operations (column 6, lines 46-51).

As per claim 5, Belsan discloses a disk drive wherein the disk drive is partitioned into data bands, the drive controller maintaining a table indicating at least recent accesses to bands (column 16, lines 61-64).

As per claim 6, Belsan discloses a disk drive comprising executing the scrub cycle on data immediately adjacent on the disk to data that is subject to a user request, as part of fulfilling the request (column 17, lines 6-9).

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As per claim 7, Belsan discloses a disk drive comprising executing the scrub cycle on first data that has been written more recently than second data, and then scrubbing the second data (column 2, lines 58-67; Note: it is understood that the priority scrub routine is more timely than the all-encompassing routine).

As per claim 8, Belsan discloses a disk drive comprising executing the scrub cycle on areas of the disk that have been more frequently accessed than other, less frequently used areas, and then scrubbing the less frequently used areas (column 2, lines 58-67; Note: it is understood that the more frequently used areas will have their priority flags set more often, and therefore will have priority over less frequently used areas).

Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Pfeffer in further view of Lester et al. (U.S. Patent No. 6,715,116).

Belsan and Pfeffer are relied upon for reasons stated in the previous section.

As per claims 2 ~~and 23~~, Belsan and Pfeffer fail to disclose a disk drive that is a RAID drive.

Lester discloses a hard disk drive with a scrubbing operation that is a RAID drive (column 9, lines 21-29).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the RAID system as described by Lester in the hard drive described by Belsan and Pfeffer. It would have been obvious because RAID systems are a commonly used storage method used in the art.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan in view of Coulson (U.S. Patent No. 6,345,349):

Belsan discloses a hard disk drive, comprising:

at least one storage disk (column 4, lines 40-50);

at least one drive controller reading data from and writing data to the disk (column 13, lines 6-8; Note: the disk drive subsystem represents the drive controller), the drive controller executing logic comprising:

executing a scrub cycle including:

receiving a user data request (column 13, lines 51-58);

determining whether an error exists in the data unit (column 12, line 65- column 13, line 6), and if so, undertaking at least one of:

recording the error (column 15, lines 59-62).

Belsan fails to disclose scrubbing an adjacent unit while servicing the request.

Coulson discloses a storage system comprising:

receiving a user data request (column 6, lines 41-51; column 6, line 62- column 7, line 6);

expanding the request to include one or more adjacent data scrub units (column 6, lines 41-51; column 6, line 62- column 7, line 6; Note: reading the data and checking for errors is the same as data scrubbing, and the entire sector includes adjacent data scrub units);

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scrubbing the data scrub unit while servicing the request (column 6, lines 41-51; column 6, line 62- column 7, line 6).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include adjacent scrubbing as described by Coulson in the hard drive described by Belsan. It would have been obvious because it allows error correction to be maintained for the entire sector (column 6, line 66- column 7, line 2).

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan and Coulson in further view of Pfeffer.

Belsan and Coulson fail to disclose a disk drive where the scrub cycle is interrupted.

Pfeffer discloses a disk drive with a scrubbing process (column 6, lines 25-35) comprising:

if a user request for at least one: a data read, and a data write, is received, interrupting the scrub cycle to fulfill the request, and then resuming the scrub cycle (column 6, lines 46-51).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the interrupt method as described by Pfeffer in the hard disk drive described by Belsan and Coulson. It would have been obvious because Pfeffer allows the scrubbing technique to continue without affecting normal disk operations (column 6, lines 46-51).



Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Belsan, Coulson, and Pfeffer in further view of Lester et al. (U.S. Patent No. 6,715,116).

Belsan, Coulson, and Pfeffer are relied upon for reasons stated in the previous section.

As per claims ~~2~~ and 23, Belsan and Pfeffer fail to disclose a disk drive that is a RAID drive.

Lester discloses a hard disk drive with a scrubbing operation that is a RAID drive (column 9, lines 21-29).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the RAID system as described by Lester in the hard drive described by Belsan, Coulson, and Pfeffer. It would have been obvious because RAID systems are a commonly used storage method used in the art.

### ***Response to Applicants' Arguments***

As per claim 21, applicant has argued that Belsan fail to disclose receiving a user data request, expanding the request to include one or more adjacent data scrub units. Claim 21 is now rejected under 35 U.S.C. 103(a) as being anticipated by Belsan in view of Coulson.

As per claim 1, applicant has argued that Pfeffer fails to disclose a delay period that depends on the frequency and/or number of user requests received from the RAID controller. Pfeffer, however, discloses a delay period that depends on a user request,

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and therefore the number of user requests is equivalent to one (even though the request is of a specific type).

As per claim 9, applicant has argued that Pfeffer fails to disclose interrupting the scrub cycle if there is a read or write request and the scrub rate exceeds a threshold rate. Claim 9 is in condition for allowance.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David G. Gentry whose telephone number is (571) 272-2570. The examiner can normally be reached on M-F 8-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**SCOTT BADERMAN**  
**SUPERVISORY PATENT EXAMINER**